

PINES TRACT VEGETATION STUDY

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The purpose of the “Pines Tract Vegetation Study” continues to be to determine if the under-mining of the coal reserves of the (Pine Tract) has had any effect on the Link Canyon Trail Columbine (*Aquilegia flavenscens var. rubicunda*) and the riparian areas within the Pines Tract coal lease area.

On July 21, 2011, the Pines Tract Area was visited by Keith Zobell (Environmental Specialist) and Mike Davis (Mining Engineer for Canyon Fuel Company, SUFCO Mine). The purpose of this trip was to revisit all of the original photographic points that have been established and to retake photographs at each site and to determine the general vegetative growth, plant vigor, and plant condition at each of the established photographic sites. These sites are revisited each year at approximately the same date each year, so as to minimize any possible seasonal variations. Photographs of each site are identified and included in this report.

Vegetative growth, vigor and condition are dependent on several factors with moisture being one of the principal ones. The below average moisture for the previous several years has had a large influence on these vegetative factors. However, for this moisture year the weather records at the SUFCO mine shows that the area has received 178% of normal with good moisture not only coming during the usual winter months but good moisture being received during the vegetative growing months of April, May, June and July. Because of this above average moisture during the growing months the entire study area and adjacent areas are showing good growth and vegetative conditions. The stream in Box Canyon continues to be basically dry above Station 090. The perennial flow starts just below station 090. There are some small intermittent flows above station 090 up to station Pines 219, with the creek being totally dry above this station. There is evidence that high flows have occurred during spring runoff and during summer rain storms. The small “Pond Area” at the Grotto continues to be dry, however there is water seeping from the cracks on the cliff face just above the pond area. This “seepage” is greater than that observed last year. Spring “Pines 105” at the riparian area at Photo point 10 continues to be dry, however the riparian area itself, inside and outside the enclosure continues to be green and having good growth and vigor.

The “Pines Tract” was not grazed this spring and there was no evidence of any domestic grazing. The overall good plant growth can be attributed to the good moisture and growing conditions that exist this year.

Photo Point 1a

Sorry, but for some unknown reason the photograph for this Photograph Point didn't turn out. However, field notes were taken and there are three Link Canyon Trail Columbines (*Aquilegia flavescens* var. *rubicunda*) at this site. All of the plants have good vigor with flower stocks 10-12 inches in length.



Photo Point 1b

At this site there are two Columbine plants. One plant has good vigor with 16-18 inch flower stocks while the other plant has poor vigor and no flower stocks

Photo Point 1c

Sorry but for some unknown reason the photograph for this site didn't turn out. However, field notes were taken for this site which indicates that there is one Columbine plant approximately 25 feet up on the cliff face and appears to be dead.



Photo Point 2

There are two columbine plants at this site with fair to good vigor. One plant has flower stocks 8-10 inches in length while the other has flower stocks 12-14 inches in length. Both plants are located 20-25 feet up on the cliff face. There is no water coming from the cracks in the cliff face.



Photo Point 3

There is one small columbine plant located behind the fallen log at the base of the rock. This plant is a young seedling with good vigor but no flower stocks.



Photo Point 4

This is a very dry site with shallow soils. There are currently three columbine plants at this site. The vigor is poor to fair (probably due to the dry site and shallow soil). Only one plant has flower stock and they are 10-12 inches in length. *Carex* (*Carex spp.*) plants are sparse and have a basal growth of 2-3 inches. Woods Rose (*Rosa woodsii*) has 3-4 inches of new growth but have no flowers or seed heads at this time. *Potentilla* (*Potentilla spp.*) has 1-2 inches of new growth. Aspen (*Populus tremuloides*) 4-5 inches of new growth. Sandberg Bluegrass (*Poa secunda*) was found at the site for the first time and had a basal growth of 4 inches with 10 inch seed heads



Photo Point 5

There are three mature columbine plants and two seedling columbine plants at this site. All of the plants have good vigor. The mature plants have 18-24 inch flower stocks while the seedling have good basal growth do not have any flower stock. The Bluegrass (*Poa pratensis*) plants have 6-8 inches of basal growth and 18-24 seedheads. Carex (*Carex spp.*) plants have 6-8 inches of basal growth but no seedheads. Yarrow (*Achillea millefolium*) plants have 3-4 inches of basal growth with 12-14 inch flower stocks. One Hairgrass (*Deschampsia caespitosa*) plant have 6 inch basal growth with 12-14 inch seedheads. There is a Red Raspberry (*Rubus strigosus*) creeping onto the site and has 36 inch leader. The site has approximately 20% bare ground. There are a few scattered annuals growing on the site. No Geranium plants were found during this site visit.



Photo Point 6

There has been no domestic grazing at this site this year. The site has 40% bare ground with 60 % vegetative cover. The overall vigor of the site is fair to good. There is no water in the Creek although the Creek bed is moist due to recent runoff from a storm event. Aspen has 15-18 inches of new growth. Carex has 8-10 inches of basal growth with 12-14 inch seed heads. Yarrow has 4-6 inches of basal growth with 20-24 inch flower stocks. The wiregrass (*Juncus spp.*) plants have 18-24 inch seed heads, however the plants are sparse at this site. Herbaceous Sage (*Artemisia ludoviciana*) has 20-24 inch seedheads. Woods Rose has 6-8 inches of new growth but no flowers yet. Joint Grass (*Equisetum Spp.*) has 8-10 inches of new growth, however the plants are sparse at this site. Mountain Brome (*Bromus marginatus*) was found at the site during this visit. It had 24-30 inch seed heads. There are numerous annuals growing on the site.



Photo Point 7

At this photo point there are still no columbine plants. There are a few Geranium plants that have 8-10 inches of new growth. Yarrow has 4 inches of basal growth and 16-18 in flower stocks. Carex is sparse and has 5-7 inches of basal growth. Bluegrass has 5-7 inches of basal growth with 22-24 inch seedheads. There is one new Aspen shoot with 6 inches of current growth. There are a few annuals growing on the site. It is estimated that the site has 60% bare ground.



Photo Point 8

This photo point is a hanging garden area located in the “Grotto” area. The ferns and lichens receive moisture that is coming from the fractures in the cliff face. The fern and lichen density is overall fair and better than last year. Fern leaf length is 3-6 inches. There is water dripping from the fractures in the cliff face.



Photo Point 9a

There is water dripping from the rock fractures in the cliff face. The fern and lichen density is good. The fern leaf length is 5-7 inches.



Photo Point 9b

There is water dripping from the fractures in the cliff face. The area is moist. Fern and lichen density is good. Fern leaf length is 4-8 inches.



Photo Point 10

There has been no domestic livestock grazing at this site. It is estimated that there is 70% bare ground with 30% vegetative cover. The vegetative condition is poor with a slight upward trend from last year. This upward trend is probably due to the good moisture the area has received. There is very little if any litter on the ground. Aspen has 6-9 inches of new growth. Woods Rose has 4-6 inches of new growth with no flowers or seed heads. Wiregrass is 8-10 inches in length with no seed stocks and is sparse throughout the site. Big Sage has 5-8 inches of current growth. There are a few Slender Wheatgrass plants (*Agropyron trachycaulum*) that have 24 inch seed heads.



Riparian Area adjacent to Photo Point 10

The vegetative condition both inside and outside the enclosure is excellent. The overall site has lush vegetative cover and excellent density. The Willow (*Salix spp.*) has 6-8 feet of current growth. The site has a dense cover of Carex, which has a 9-11 inch leaf length. Bluegrass has 20-24 inch seedheads.

Redtop (*Agrostis alba*) is 12-14 inch seed heads. At this point in time the loss of the flow from spring Pines 105 has not affected the vegetative conditions of the riparian area.